REMARKS

Claims 1-10, 12-14, 24-30, and 32-34 are now pending in the application. Claims 11, 15-23, 31, and 35-38 have been cancelled. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

CLAIM OBJECTIONS

Claims 8, 11, 28, and 31 are objected to for containing informalities. Claims 8 and 28 are objected to because it appears that "ceramics" should be -- ceramic --. Claims 8 and 28, therefore, have been amended to delete "ceramics" and insert – ceramic--. Claims 11 and 31 are objected to for being in improper dependent form as the limitation regarding the presence of a hard and soft magnetic phase is already recited in independent claims 1 and 3, respectively. Claims 11 and 31, therefore, have been cancelled. As such, the objections raised by the Examiner should now be rendered moot.

REJECTION UNDER 35 U.S.C. § 112

Claims 1-14 and 24-34 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. This rejection is respectfully traversed.

Claims 1, 2, 3, 4, 6, 9, 10, 12, 24, 26, 28, 29, 30, and 32 have been amended to eliminate each indefinite phrase cited by the Examiner. Claims 11 and 31 have been

cancelled. Therefore, reconsideration and withdrawal of this rejection is respectfully requested.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-14 and 24-34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wang et al (J. Appl. Phys., Vol. 81, No.8, 15 April 1997, pp. 5097-5099). This rejection is respectfully traversed.

The Examiner alleges that Wang teaches an alloy composition that, with the exception of the boron (B) content, is completely encompassed by the instant claims. The Examiner further alleges that one of ordinary skill in the art would have considered the claimed invention obvious because the alloy taught by Wang differs in only the B content and thus closely approximates the claimed magnetic powder so that one would expect the alloy composition of Wang would have the same properties.

Applicants respectfully assert, however, that Wang actually does not teach an alloy composition encompassed by the claimed invention. The claimed invention calls for a magnetic powder that comprises a composite structure that includes a soft magnetic phase and a hard magnetic phase. On pages 17-18 of the present application, the hard magnetic phase is described as a $R_2TM_{14}B$ phase and the soft magnetic phase is described as an α-Fe or an α-(Fe, Co) phase. Wang also teaches a magnetic alloy with such a composite structure. As described in the abstract of Wang, however, Wang teaches composite structure wherein the hard magnetic phase is comprised of a $(NdDy)_2(FeNb)_{14}B$ phase. As such, the rare earth content of Wang includes Nd and Dy.

In contrast, the claimed invention and in particular claims 1 and 3, calls for a magnetic powder comprising an alloy composition represented by $R_x(Fe_{1-a}Co_a)_{100-x-y-z}B_yM_z$, where R is at least one rare earth element except Dy. Wang teaches an alloy composition with a rare earth content that includes Dy. By including Dy in the rare earth content, Wang directly teaches away from the claimed invention. Furthermore, by including Dy in the rare earth content, the alloy composition of Wang will comprise a composite structure that is different from the claimed magnetic powder. More particularly, the hard magnetic phase of the claimed invention will not include Dy. As such, the magnetic powder of the claimed invention is different than the magnetic powder of Wang.

Still furthermore, Wang contains no suggestion or motivation to utilize a magnetic powder that does not include Dy in the rare earth content. Not a single example in Table 1 of Wang exhibits a composition that teaches the claimed composition. More particularly, not a single example composition of Wang teaches the claimed composition of $R_x(Fe_{1-a}Co_a)_{100-x-y-z}B_yM_z$. More specifically, each example composition of Wang either teaches Dy in the rare earth content or does not contain the element M_z (i.e., the Nd-Fe-B compositions). Absent this motivation or suggestion, it would not have been obvious.

Claims 1-14 and 24-34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Panchanathan (USPN 5,725,792) or Mohri et al (USPN 4,765,848). This rejection is respectfully traversed.

The Examiner alleges that both Panchanathan and Mohri teach an alloy compositions that overlap the claimed magnetic powder. Furthermore, the Examiner

alleges that due to this overlap, the claimed magnetic powder would have been obvious because the alloys taught by both Panchanathan and Mohri would have the same properties as the claimed invention.

With respect to Panchanathan, the claimed invention calls for an intrinsic coercive force H_{CJ} of the bonded magnet at room temperature to be in the range of 400-750 kA/m. In contrast, Panchanathan in column 3, beneath Example 2, merely teaches a coercive force of 5.02 kOe (399.5 kA/m). Such a low coercive force is not desired by the claimed invention. The benefits of a coercive force in the claimed range of 400-750 kA/m is described on page 28 of the specification.

> "The coercive force (H_{CJ}) of the bonded magnet (that is, the intrinsic coercive force at room temperature) should lie in the range of 400-750 kA/m. In this case, it is preferred that the coercive force lies in the range of 430 to 720 kA/m. If the coercive force is lower than the lower limit value, demagnetization occurs conspicuously when a reverse magnetic field is applied depending upon the usage of the motor, and the heat resistance at a high temperature is deteriorated. On the other hand, if the coercive force exceeds the above upper limit value, magnetizability is deteriorated. Therefore, by setting the coercive force (H_{CJ}) to the above range, in the case where the bonded magnet (cylindrical magnet in particular) is subjected to multi-polar magnetization, a satisfactory magnetization with a sufficiently high magnetic flux density can be accomplished even when a sufficiently high magnetizing field cannot be secured, which makes it possible to provide high performance bonded magnets, especially high performance bonded magnets for motors."

As described in the above excerpt from the specification, when the coercive force is lower than the claimed range, demagnetization occurs when a reverse

magnetic field is applied and the heat resistance at a high temperature is deteriorated. This is not desired by the claimed invention. As such, Panchanathan teaches a magnetic alloy that has characteristics which the claimed invention intends to avoid and therefore, teaches away from the claimed invention.

Furthermore, each example enumerated in Panchanathan contains a total rare earth content that is outside of the claimed range of 7.1-9.9 at%. More specifically, Examples A to N of Panchanathan have a rare earth content that ranges between 15% (Example A) and 21.9% (Example K). This rare earth content is much greater than the claimed range. Still furthermore, each example in Panchanathan also has a total B content less than the claimed range of 4.6-8.0 at%. More specifically, the maximum B content in the examples enumerated by Panchanathan is 1.9%. This is well below the claimed range. As such, although Panchanathan allegedly teaches an alloy composition that overlaps the claimed composition, the subject matter taught by Panchanathan is not taught with sufficient specificity to anticipate the claims. The claimed invention calls for a total rare earth content in the narrow range of 7.1-9.9 at%. In contrast, Panchanathan teaches a total rare earth content in the broad range of 5-25%, but not a single example is taught is within the claimed ranges of rare earth content and B content. As such, there is no suggestion or motivation to utilize such a narrow range. Moreover, although the claimed invention calls for a relatively lower rare earth content in comparison to the examples enumerated by Panchanathan, the claimed invention still achieves an intrinsic coercive force that is greater than any of the examples disclosed by Panchanathan. Therefore, Applicants respectfully assert that the claimed magnetic powder is not obvious in view of Panchanathan.

With respect to Mohri, the Applicants also respectfully assert that although Mohri teaches a total rare earth content that overlaps the claimed range of 7.1 – 9.9 at%, each example taught by Mohri utilizes a total rare earth content of 17%. More specifically, referring to Tables 1-8 of Mohri, each example enumerated contains 17% total rare earth content. This is far greater than the claimed range of 7.1 – 9.9 at%. As such, although Mohri allegedly teaches an alloy composition that overlaps the claimed composition, the subject matter taught by Mohri is also not taught with sufficient specificity to anticipate the claims. Moreover, by not teaching the rare earth content with sufficient specificity, the claimed range would not have been obvious. As each example taught by Mohri contains 17% rare earth content, there is no suggestion or motivation to utilize the claimed narrow range of 7.1 – 9.9 at%.

Furthermore, Mohri teaches a composition that requires the elements Ce and La. Dependent claim 9 of the present invention calls for R to be comprised of rare earth elements containing Nd and/or Pr. As Mohri explicitly teaches the necessity of utilizing Ce and La in the magnetic alloy, Applicant respectfully asserts that the subject matter of dependent claim 9 should be in condition for allowance in view of the teachings of Mohri. That is, there is no suggestion or motivation to utilize rare earth elements containing mainly Nd and/or Pr. Absent this motivation, the subject matter of dependent claim 9 would not have been obvious.

DOUBLE-PATENTING

Claims 1-14 and 24-34 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-14 and 23-33 of co-pending Application No. 09/875,789;

Claims 1 to 14 and 24 to 34 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 to 13 and 16 to 22 of co-pending Application No. 09/863,072; and

Claims 1 to 14 and 24 to 34 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 to 12 and 18 of co-pending Application No. 09/754,823 and claims 1 to 10 and 14 of co-pending Application No. 09/754,463.

Applicant elects to defer filing a terminal disclaimer for each of the above-identified co-pending Applications until the Examiner has considered the remarks set forth above in the rebuttal of the rejection under 35 U.S.C. § 103(a).

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt

and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: December 16, 2002

By: _____

G. Gregory Schivley
Reg. No. 27,382
Jason A. Heist
Reg. No. 51,797

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

GGS/BEW/JAH

ATTACHMENT FOR CLAIM AMENDMENTS

The following is a marked up version of each amended claim in which underlines indicates insertions and strike-throughs indicate deletions.

1. (Amended) A ~~Magnetic~~ magnetic powder ~~composed of~~ comprising:

an alloy composition represented by $R_x(Fe_{1-a}Co_a)_{100-x-y-z}B_yM_z$ (where R is at least one ~~kind of~~ rare-earth element ~~excepting~~ except Dy, M is at least one ~~kind of~~ element selected from Ti, Cr, Nb, Mo, Hf, W, Mn, and Zr, ~~and Dy,~~ x is 7.1 - 9.9 at%, y is 4.6 – 8.0 at%, z is 0.1 - 3.0 at%, and a is 0 - 0.30), ~~and~~ wherein the magnetic powder ~~being constituted from~~ further comprises a composite structure having a soft magnetic phase and a hard magnetic phase~~,~~; and

wherein when the magnetic powder is mixed with a binding resin and then the mixture is subjected to compaction molding to form a bonded magnet having a density ρ[Mg/m^3], ~~the~~ a maximum magnetic energy product (BH)max[kJ/m^3] of the bonded magnet at ~~a~~ room temperature satisfies the relationship represented by the formula of $(BH)max/\rho^2[x10^{-9}J\cdot m^3/g^2] \geq 2.40$, and the intrinsic coercive force H_{CJ} of the bonded magnet at ~~a~~ room temperature is in the range of 400 – 750 KA/m.

2. (Amended) The magnetic powder as claimed in claim 1, wherein the remanent magnetic flux density Br[T] of the bonded magnet at ~~a~~ room temperature satisfies the relationship represented by the formula of $Br/\rho[x10^{-6}T\cdot m^3/g] \geq 0.125$.

3. (Amended) A ~~Magnetic~~ magnetic powder ~~composed of~~ comprising:

an alloy composition represented by $R_x(Fe_{1-a}Co_a)_{100-x-y-z}B_yM_z$ (where R is at least one ~~kind of~~ rare-earth element ~~excepting~~ except Dy, M is at least one ~~kind of~~ element selected from Ti, Cr, Nb, Mo, Hf, W, Mn, and Zr, ~~and Dy,~~ x is 7.1 - 9.9 at%, y is 4.6 - 8.0 at%, z is 0.1 – 3.0 at%, and a is 0 - 0.30), ~~and~~ wherein the magnetic powder ~~being constituted from~~ further comprises a composite structure having a soft magnetic phase and a hard magnetic phase~~,~~ ; and

wherein when the magnetic powder is mixed with a binding resin and then the mixture is subjected to compaction molding to form a bonded magnet having a density ρ[Mg/m^3], ~~the~~ a remanent magnetic flux density Br[T] of the bonded magnet at a room temperature satisfies the relationship represented by the formula of Br/ρ [$x10^{-6}$T·m^3/g] ≥ 0.125 and the instrinsic coercive force H_{cJ} of the bonded magnet at a room temperature is in the range of 400-750 kA/m.

4. (Amended) The magnetic powder as claimed in claim 1, wherein the magnetic powder ~~is~~ has been obtained by milling a melt spun ribbon.

6. (Amended) The magnetic powder as claimed in claim 4, wherein the melt spun ribbon ~~is~~ has been obtained by colliding a molten alloy of a magnetic material onto a circumferential surface of a cooling roll which is rotating to cool and then solidify ~~it~~ the molten alloy.

8. (Amended) The magnetic powder as claimed in claim 7, wherein the outer surface layer of the cooling roll is formed of a ~~ceramics~~ ceramic.

9. (Amended) The magnetic powder as claimed in claim 1, wherein said R comprises rare-earth elements ~~mainly~~ containing Nd and / or Pr.

10 (Amended) The magnetic powder as claimed in claim 1, wherein said R includes Pr and ~~its~~ a ratio of Pr with respect to the total mass of said R is 5 – 75%.

12. (Amended) The magnetic powder as claimed in claim 1, wherein the magnetic powder ~~is~~ has been subjected to a heat treatment ~~for~~ at least once during the manufacturing process or after ~~its~~ the manufacture of the magnetic powder.

24. (Amended) The magnetic powder as claimed in claim 3, wherein the magnetic powder ~~is~~ has been obtained by milling a melt spun ribbon.

26. (Amended) The magnetic powder as claimed in claim 24, wherein the melt spun ribbon ~~is~~ has been obtained by colliding a molten alloy of a magnetic material onto a circumferential surface of a cooling roll which is rotating to cool and then solidify ~~it~~ the molten alloy.

28. (Amended) The magnetic powder as claimed in claim 27, wherein the outer surface layer of the cooling roll is formed of a ~~ceramics~~ ceramic.

29. (Amended) The magnetic powder as claimed in claim 3, wherein said R comprises rare-earth element ~~mainly~~ containing Nd and / or Pr.

30. (Amended) The magnetic powder as claimed in claim 3, wherein said R includes Pr and ~~its~~ a ratio of Pr with respect to the total mass of said R is 5 – 75%.

32. (Amended) The magnetic powder as claimed in claim 3, wherein the magnetic powder ~~is~~ has been subjected to a heat treatment ~~for~~ at least once during the manufacturing process or after ~~its~~ the manufacture of the magnetic powder.